

Morphological Variation of *Pangium edule* Reinw. Fruits in Malaysia

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Abstract

Morphological variation of fruits and seeds occurring in *Pangium edule* is described. The fruits of typical form, "kepayang lenga" are oblong with blunt apices , those of "kepayang papan" are subglobular and the apices are sharp while those of "kepayang bubur" are ellipsoidal and the apices are blunt. Seeds differ in their sizes too.

Introduction

Pangium edule or commonly known as "kepayang", is monotypic and belongs to the family Flacourtiaceae. The trees are either found wild or more commonly, cultivated on a small scale throughout Southeast Asia, Melanesia and Micronesia. They reach the height of 25 m and frequently as tall as c. 40 m. As the boles are straight and often reach the extreme diameter of 1 m, they offer good timber source to the locals. The seeds contain high quality oil which has been used for cooking for hundreds of years, moreover the roasted seeds have long been used for the preservation of meat and fishes. Many more uses are documented by Sleumer (1954) and Burkhill (1966). In Indonesia and elsewhere the use of the fruits as food is very widespread. In Sarawak the oil is used for cooking and for preserving fish and meat.

Prior to this, the intraspecific variation especially that of the fruits and seeds has not been described. During the trips made by the author to Sarawak to collect samples of the species, observations were made on the occurrence of the variations in this species and herein described.

Materials and Methods

The morphological observations were made on the materials either collected personally by the author in the field or those deposited in various herbaria in the country. Those of the former were deposited in the Herbarium, Forestry faculty, Universiti Pertanian Malaysia (tentatively designated UPMF).

The fruits and seeds collected were observed on the following characters; shape, size, shape and length of the apex. They were then opened to observe the seeds; observation on the seeds were made for the characters of overall shape and size.

Observations

General morphology

Tree branching at about 5 m, buttress small to spreading, up to 1.5 m high. Inner bark cream-yellowish with orange tints. Sapwood yellowish to orangish, slash giving a colourless exudate with a distinct smell of malt. Leaves are ovate and heterophyllous, often on the same branch or tree of any age, up to 75 cm long. Flowers rather fragrant, flowering starts immediately after every new flush of leaves. Fruits 1-(4) per infructescence of varying sizes ($16-24 \times 10-16$ cm), oblong to ellipsoidal in shape with bluntly to distinctly sharp tips, rather heavy, each weighing up to 2.5 kg, fruiting 1-4 times per year, fruits smaller with massive fruiting, no indication of maturity of fruits from the trees until they fall and rot, fruit stalk up to 60 cm long. Seeds interlocked, embedded in a pungent mesocarp when ripe, almost triangular in shape, 13-40 in number.

Fruit and seeds morphology

Ridley (1922) described the fruits of *Pangium edule* as 17-30 cm long and 9-10 cm across and seeds were recorded as about 5 cm across and triangular in outline. Sleumer (1954) gave a more extensive description of the fruits as being oblong-ovoid, variable in size with blunt tips and containing about 20 irregularly shaped seeds ($3\text{-}4\text{-}6 \times 2\text{-}3\text{-}4$) cm in size. In this context he had mentioned that the fruits are variable in size, and shape and the seeds are also variable in size. All these descriptions seem to refer to the typical form or "kepayang lenga" (as used in this paper).

Whitmore (1973) on the other hand, described the fruits of *Pangium edule* as pear-shaped with blunt tips and 15-25 by 7-15 cm in size with seeds about 4 cm long. This description seems to refer to "kepayang lenga" too.

While collecting specimens in Sarawak, the author recognised two distinct variants of the *Pangium edule* with respect to fruits and seeds morphology and they are described below:

Typical form of *Pangium edule*

Vernacular names: "kepayang", "payang", "buah keluak", "kepayang lenga", "kepayang keluwak" or "pangi".

Description: Fruits, oblong to oblong-oval, $18\text{-}23 \times 10\text{-}14$ cm, tips almost rounded, blunt, ca. 0.5 cm long; seeds $3.5\text{-}4.0\text{-}6.0$ cm, seeds per fruit 25-30 (Fig. 1 a-b).

Specimens studied: SARAWAK, Serian, Ilias Paie S.28040 (SAR); Miri, Jack Liam s.n. (SAR); Miri, Anderson S.16428 (SAR); Niah, Anon. KFN 98660 (SAR); Kuching, Faridah-Hanum FHI 398 (UPMF); Samarahan, Faridah-Hanum FHI 401,

FHI 403, FHI 404, FHI 405, FHI 406, FHI 407, FHI 408, FHI 411 (UPMF): 7th Division, Ulu Sg. Melinau, Hose Mt., P. Chai S.37224 (SAR); Kuching, Pedawan Rd., P. Chai & Erwin S. 27525 (SAR); Niah, G. Subis, Anderson S. 16428 (SAR); Belaga, B. Lee S. 39813 (SAR); SABAH, Inanam, Burgess SAN 28421 (SAN); Beluran, Amin G. et al. SAN 93886 (SAN); Beaufort, Mikil SAN 34593 (SAN); Keningau, Amin G. SAN 95499 (SAN); Tongod, Aban & Clement SAN 69926 (SAN). PAHANG, Ulu Dong, Faridah-Hanum FHI 360, FHI 361 (UPMF); Temerloh, Faridah-Hanum FHI 359 (UPMF); Sg. Triang, Kassim 40368 (KEP); PERAK, Temenggor; King's Coll. 10065 (K); Kg. Temenggor, Chelliah FRI 98660 (KEP); SELANGOR; s.l., Tachun bin Baba 57086 (KEP); Ulu Langat, Gadoh anak Umbai KL 1871 (KEP); Kepong, Kochummen FRI 19098 (KEP); KELANTAN, Gua Musang, Husmady et al. FRI 39709 (KEP).

The two variants observed are as follows:

Pangium edule "kepayang papan".

Description: Fruits subglobular to ellipsoidal, 16-24 x 11-16 cm, tips oblong-triangular, sharp, 1.5-2.0 cm long; seeds 3.5-5.5. cm, seeds per fruit (13-) 20-24 (-29). (Fig. 1 c-d)

Specimens studied: SARAWAK, Seri Aman, Faridah-Hanum FHI 400 (UPMF); Samarahan, Tarat, Faridah-Hanum FHI 410, FHI 412, FHI 413; Seri Aman Division, Faridah-Hanum FHI 399 (UPMF); Serian, Ilias Paie S. 28040 (SAR); Ulu Kapit, P. Chai et al. S. 33309 (SAR).

Pangium edule "bubur".

Description: Fruits ellipsoid to oval, 18-20 x 12-14 cm, tips almost rounded, blunt, ca. 0.5 cm long; seeds 2.5-3.0(-4.0) cm, seeds per fruit 25-30(-40). (Fig. 1 e-f).

Specimen studied: SARAWAK, Seri Aman, Faridah-Hanum FHI 402 (UPMF); Samarahan, Tarat, Faridah-Hanum FHI 409, FHI 414, FHI 415 (UPMF).

Distribution: Throughout Malesia, extending to Melanesia and Micronesia, apparently there is some variation in Borneo too: in Malaysia throughout (Fig. 2).

Burkill (1966) cited the following vernacular names for Peninsular Malaysia, viz. *kepayang*, *payang* and *buah keluak*. The typical *Pangium edule* or *kepayang lenga*, *kepayang*, *payang* is distributed widely in Sabah, Sarawak and Peninsular Malaysia but its variants, *Kepayang papan* and *kepayang bubur* so far have only been found Sarawak, Borneo.

Discussion

Except for the differences in the fruit and seed characters, other morphological characters remain very similar. Recent observations and collections made by the

author showed that description by Corner (1940), Sleumer (1954) and Whitmore (1973) all could be referred to "kepayang lenga", the typical *P. edule*. The other two types observed are atypical of the "kepayang".

While the fruits of *kepayang papan* are almost globular the seeds are similar to those of *kepayang lenga* in both their shape and size. However, the fruits of *kepayang bubur* are smaller and ellipsoidal and the seeds are relatively smaller too.

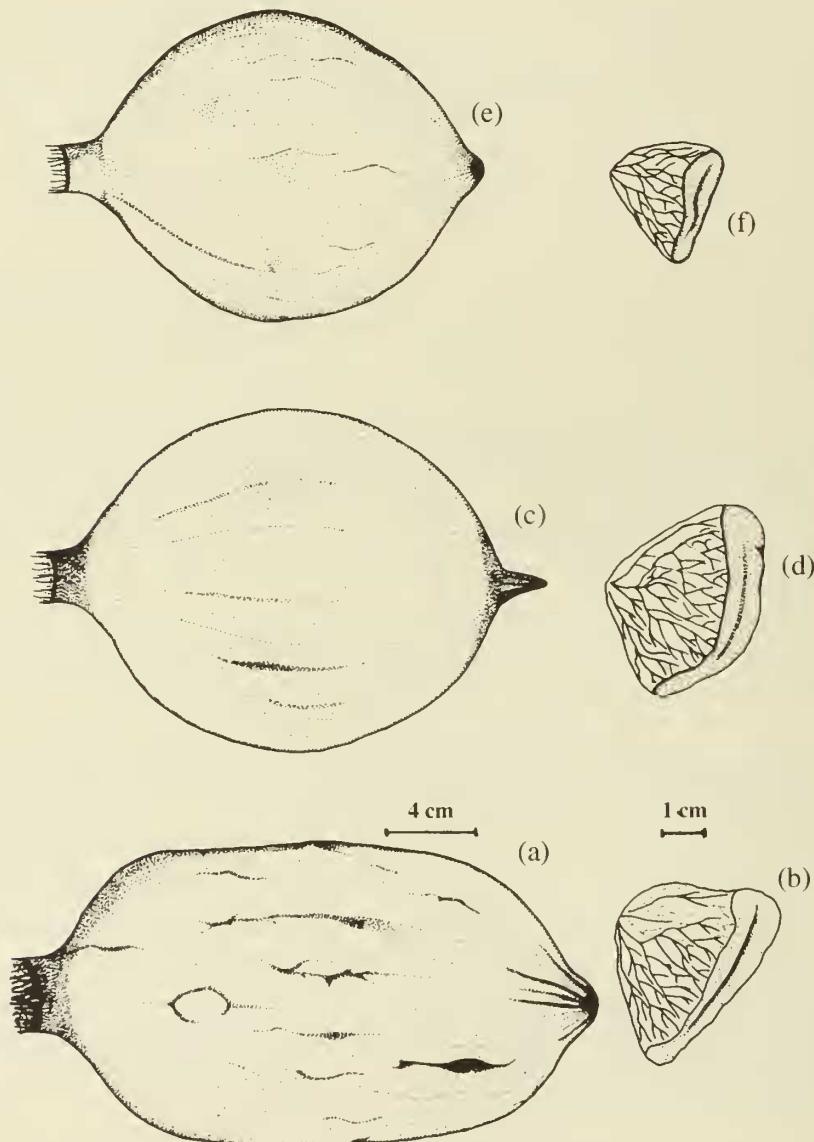


Fig. 1. Morphology of fruits and seeds of *Pangium edule*. (a-b, *kepayang lenga*; c-d, *kepayang papan*; e-f, *kepayang bubur*)

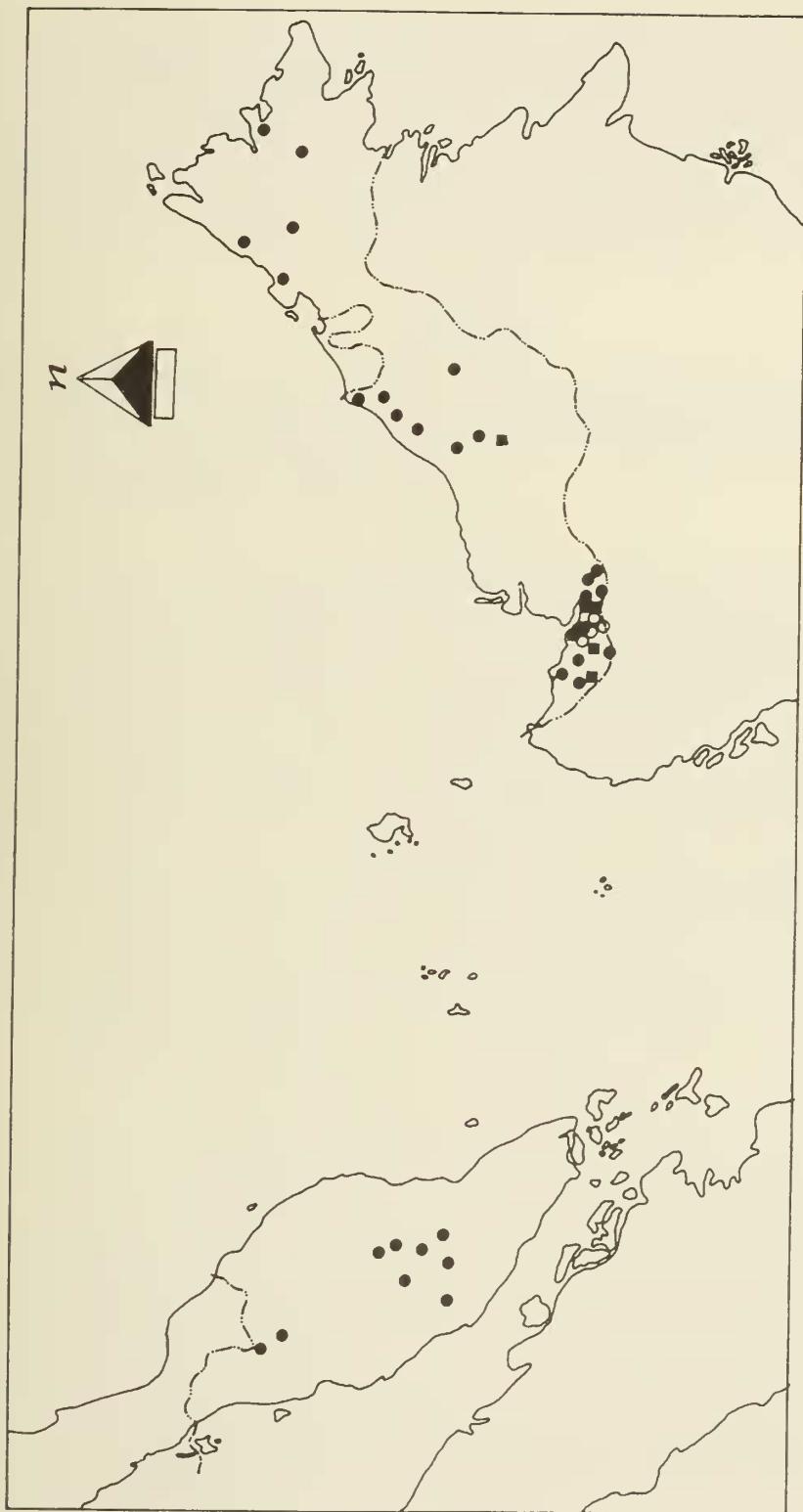


Fig. 2. Distribution of *Pangium edule* in Malaysia. (● *kepayang lenga*, ■ *kepayang papan*, and ○ *kepayang bubur*).

Acknowledgements

The author would like to thank the International Foundation of Science (IFS), Sweden for the financial support given through Grant No. D/2255-1. I am grateful to the Director of the Agriculture Department, Sarawak and his staff for support while I was in Sarawak. Thanks are also due to Mr. Chai Chen Chong of the Agriculture Research Centre, Semonggok, Sarawak for assisting me in the field.

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